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(56) Documents cited
GB 2166792 A GB 1209471 A GB 0983260 A
EP 0202510 A2 EP 0063623 A1

(58) Field of search
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INT CL⁴ E06B

(54) Window of door frame

(57) A moulding for UPVC sealed unit double glazed window or door comprises core and adaptor sections which may be assembled together to provide L, T or Z cross-sections, in which the adaptor sections are provided with tongues which are interlockable in corresponding grooves formed in the core section. The tongues have longitudinal channels formed therein, the walls of the channel being resiliently displaceable to permit location of the tongues in the grooves by snap action. A glazing bar may be provided with an off-set protuberance to be held in engagement with one of the grooves by the glass.

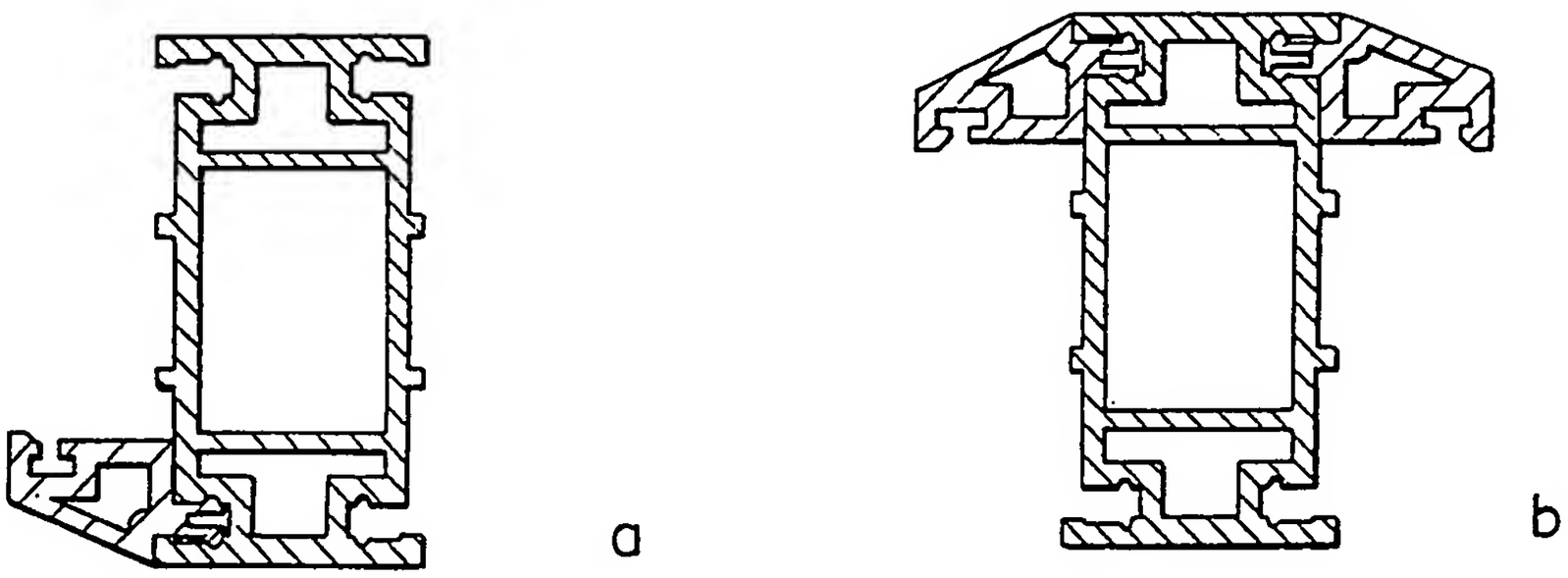

FIG 5

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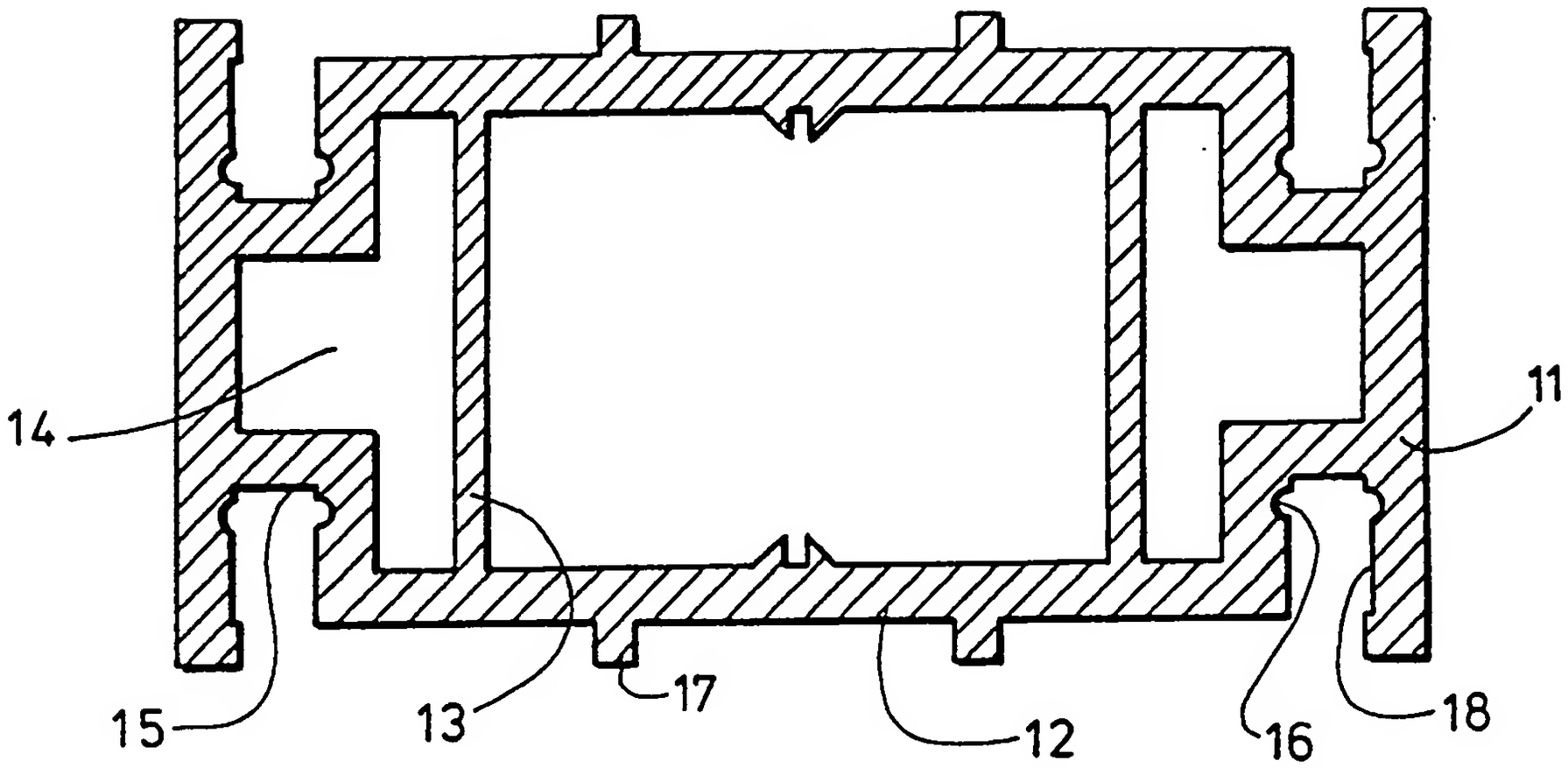


FIG 1

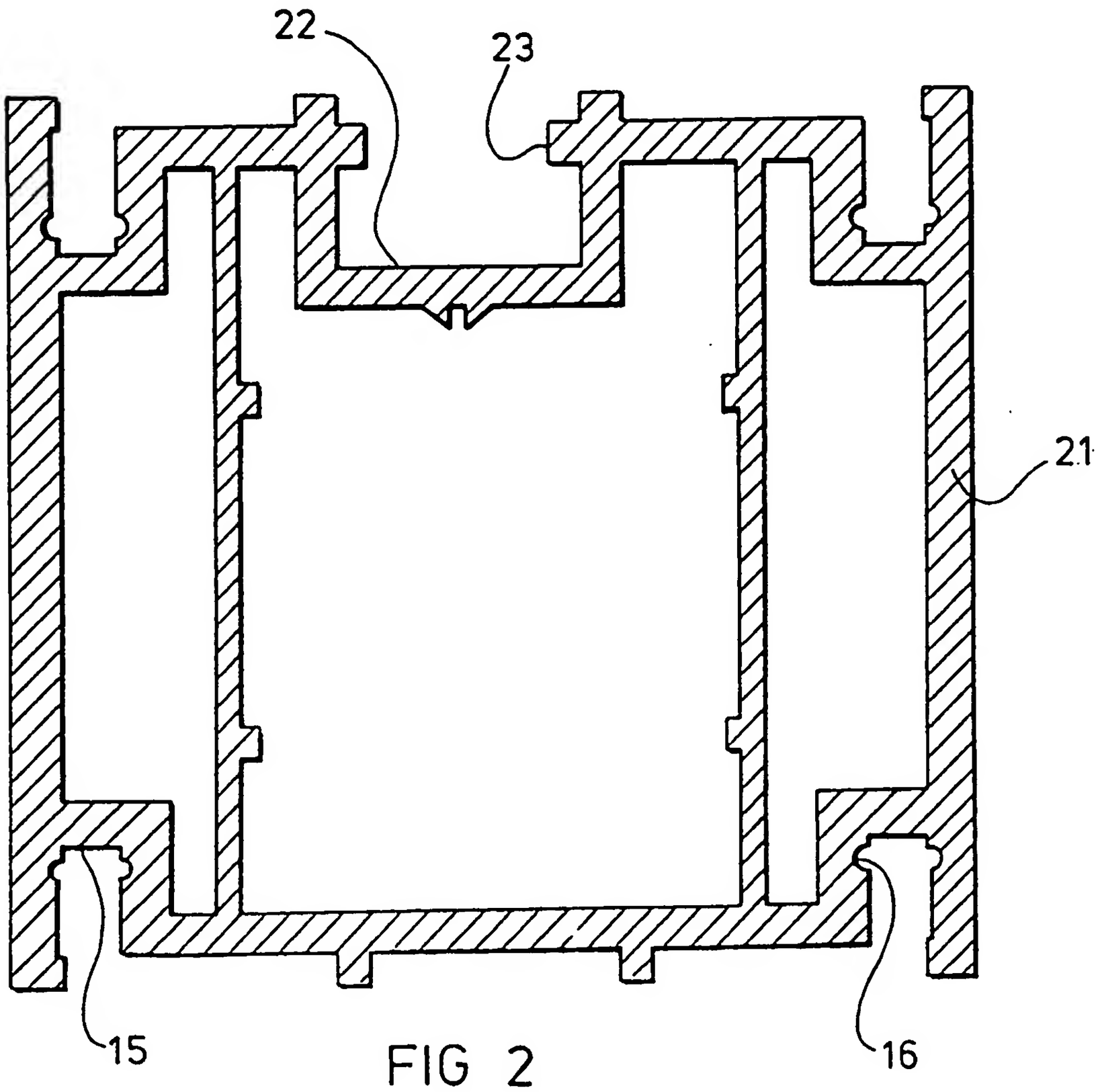


FIG 2

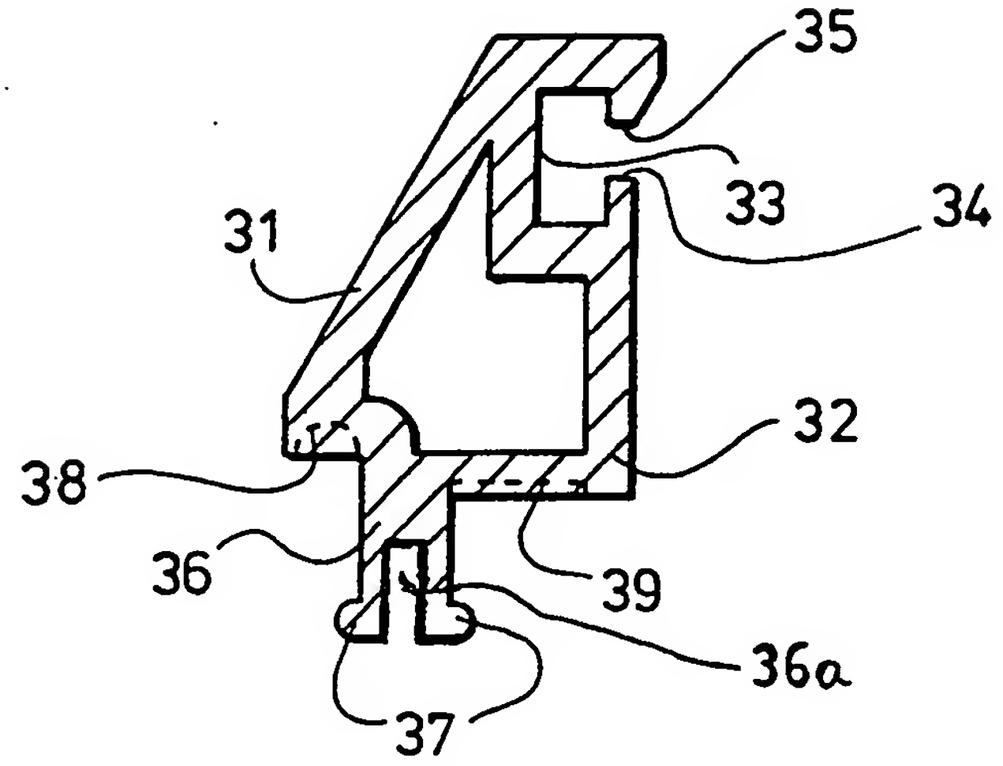


FIG 3

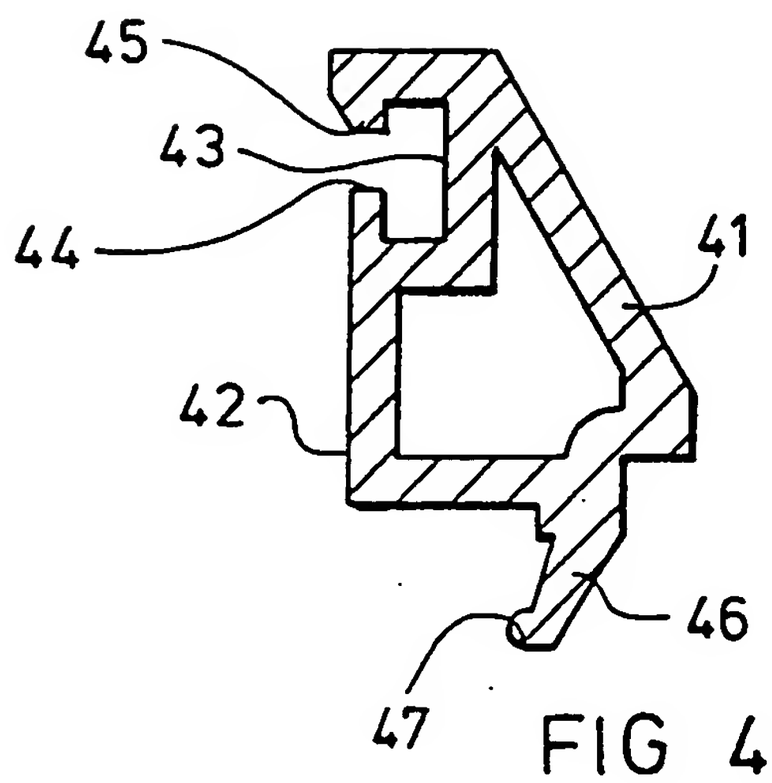
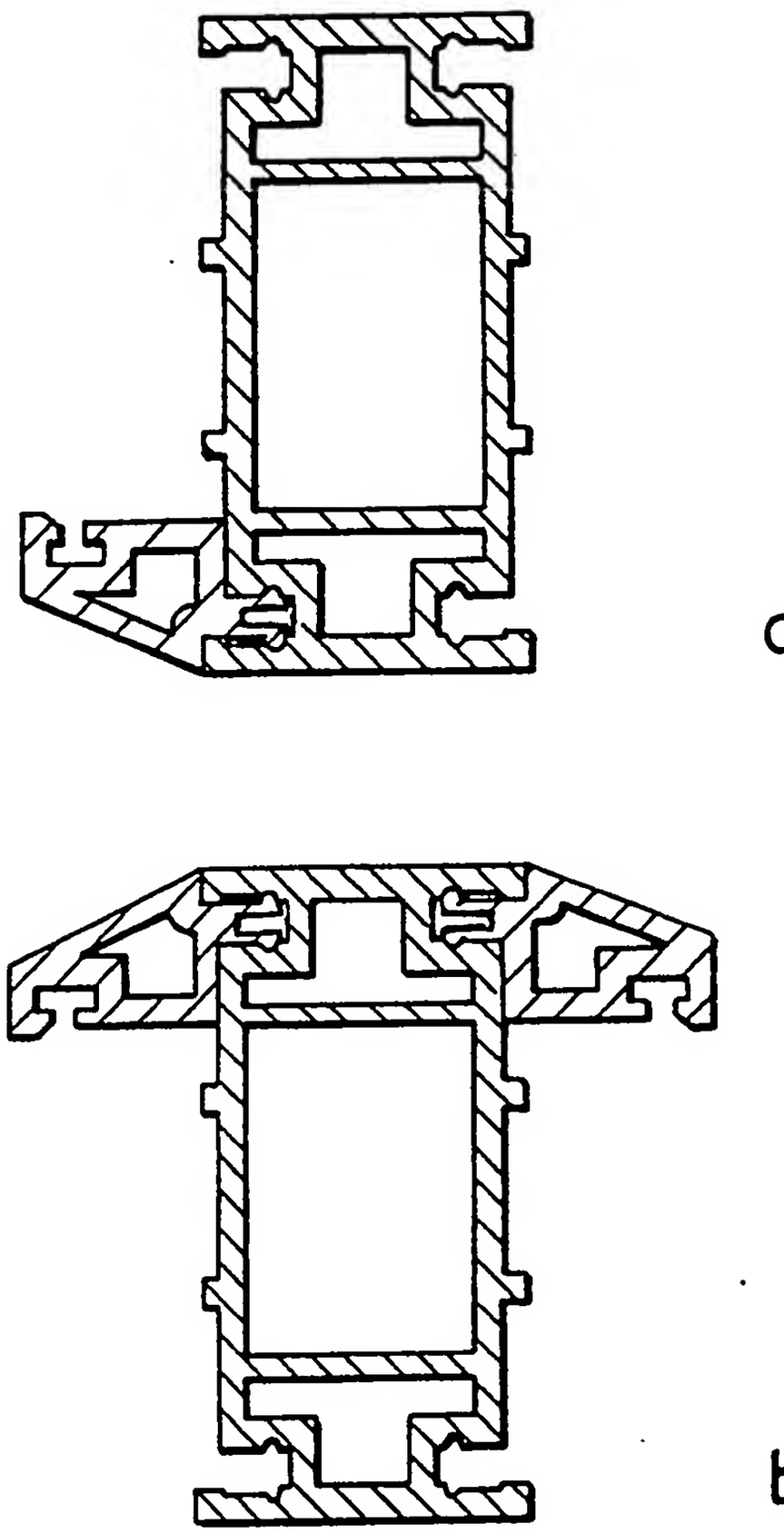


FIG 4



a

b

c

FIG 5

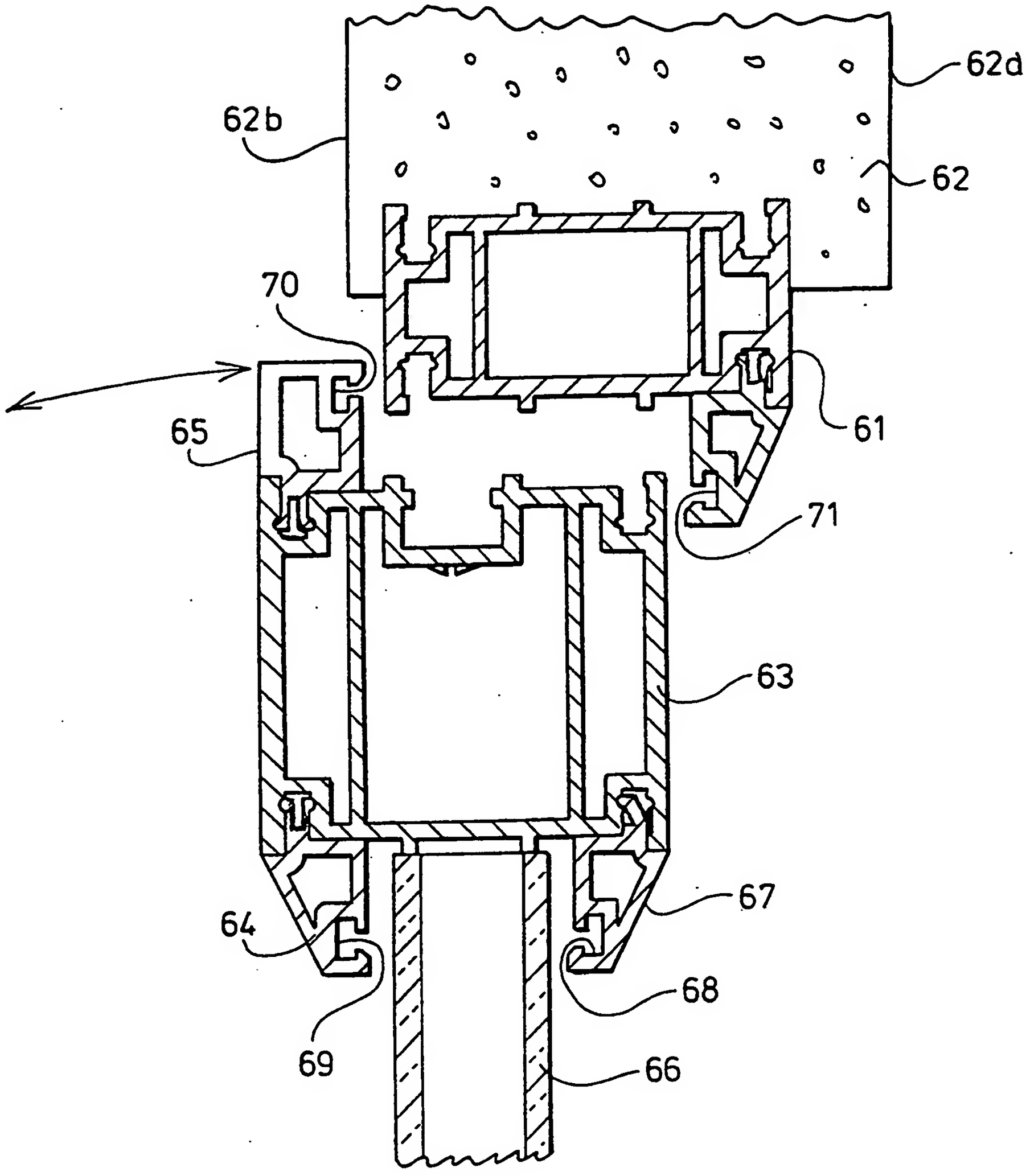


FIG 6

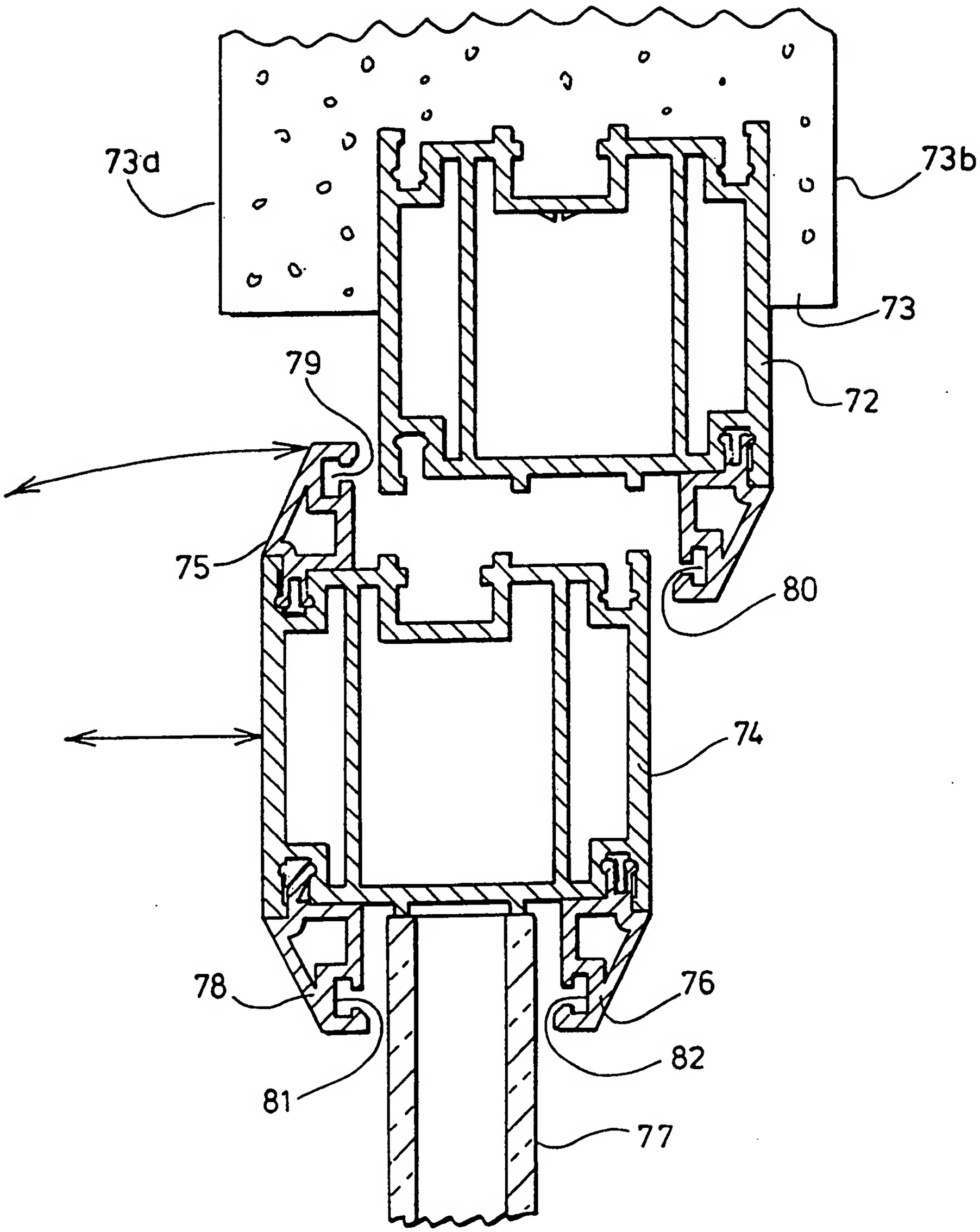


FIG 7

WINDOW AND DOOR FRAME

This invention relates to window and door frames, in particular to mouldings used in the manufacture of plastics and other window and door frames, especially for the provision of sealed-unit double glazed windows and doors.

Plastics window and door frames are increasingly popular, being frequently specified both for new buildings and for the replacement market, especially where it is desired to fit sealed-unit double glazing, and are referred to in the trade as "UPVC" windows, doors or frames. Mouldings needed to provide the various different types of window (such as, for example, sliding patio doors, standard vertically-hinged opening casements, tilt-and-turn casements which tilt about a horizontal axis for ventilation and which open inwardly about a vertical side axis for cleaning, horizontally-hinged outward-opening ventilators and the like, as well as for various styles, such as multi-paned windows which require transom and mullions) are required to be produced in various cross-sectional shapes. For example, a standard side frame moulding will have a main box section and a subsidiary box section integrally formed at one side only to define an L in cross-section; a mullion for fixed lights either side will have a subsidiary box section crossing the end of the main box section to define a T; and a mullion with a fixed light to one side and an opening casement to the other may require oppositely and alternately disposed subsidiary box sections to define a Z in cross-section. The mouldings should also be formed, or be capable of being formed, with channels to accommodate operating mechanisms such as friction stays, tilt-and-turn

mechanisms, sliding latches and the like. Generally these channels have standard dimensions irrespective of the manufacturer, at least for use in Europe, and are referred to in the trade as "Eurochannels".

Depending on the intended use, window and door frames are in general either heavy-duty (so-called "architectural" specification) size or light-duty ("slim-line" specification) size. For some particular applications, an intermediate-duty size is also used. Thus, for L, T and Z sections, nine (or, more commonly, six) basic mouldings are required and, including the provision of mechanism channels, eighteen (or, more commonly, twelve) mouldings are required, and this creates exceptionally high costs, not only in terms of manufacturing machinery and dies but also in terms of storage, distribution and inventory level.

Having formed the required types of moulding into a frame, glazing is then inserted into the rebate formed between the main and subsidiary sections and secured in place by glazing beads, generally held in place in grooves formed in the mouldings. Desirably, glazing is carried out from the interior of the building. Thus, in the case for example of an "L" section side moulding for a window having a non-opening main light and an outwardly-opening top ventilator, the subsidiary side box section should face to the outside over the extent of the main light, to allow interior glazing, and to the inside for the ventilator, to allow the ventilator to open outwardly. For this purpose, an assembly process known as reverse butt welding is followed, in which the side moulding is cut through at a point between the main light and the ventilator and the two portions are welded together at their ends in the opposite fashion, to

provide the subsidiary box section to the front (or outside) over some of its length and to the back (or inside) over the remainder. However, reverse butt welding is labour- and time-intensive and furthermore is difficult to achieve with precision, since the welding process consumes an unspecified length of moulding.

Overall, the manufacture of mouldings in integral lengths and their assembly into complete door or window frames is highly expensive, particularly in view of the large number of different types of moulding required.

One proposal for reducing the number of required manufactured mouldings, to enable the various sections to be built up from a smaller number of members which fit together in different ways to provide the "L", "T" and "Z" sections, is described in GB 2166792A, according to which a profiled strip having an angled portion to define the glazing rebate is positively snap locked into a box-shaped basic section between latching zones provided on opposed sides of the section. The strip is itself provided with a latching projection for snap-engagement of a glazing bead. However, although the profiled strips can be inserted either way round on both sides, or on one side only, of the basic section, thus enabling all three of the required cross-sectional shapes to be provided from two mouldings, it is not possible to provide such sections with mechanism channels due to the fact that the strips extend across the entire width of the basic section. Furthermore, in practice it is found that the profiled strips are not sufficiently securely held in the basic section to provide adequate security without substantial additional reinforcement, for example by way of screws.

A further proposal is disclosed in EP-A 0202510, in which a hollow rectangular main bar has slots formed at each corner in which flange strips may be inserted and retained by means of a snap-engageable rib member.

It is an object of the present invention to provide a door or window frame moulding which can be built from a minimum number of parts, thereby effecting substantial savings in manufacture, distribution storage and inventory costs irrespective of the particular shape of moulding required. Further objects include the provision of such mouldings which in addition can be formed with channels for receipt of operating mechanisms, which avoid the need for reverse butt welding during the assembly of frames from the mouldings, and in which the component parts may be assembled together by lateral snap-action or longitudinal sliding movement but, once assembled, are laterally non-disengageable although longitudinally slidably displaceable.

According to the present invention, a composite window or door frame moulding comprises a core section and an adaptor section interengageable with the core section, in which interengagement is provided by a tongue formed on one of the said sections and a groove formed in the other, in which the tongue and the groove are provided with mutually interlockable complementary formations to prevent lateral disengagement of the sections, the free end region of the tongue being channel-sectioned and the side walls of the channel being resiliently displaceable within the groove to permit snap-engagement of the said complementary formations.

The complementary formations may be constituted by a

second tongue, formed on the base of the groove to be interengageable with the channel section in the first tongue, at least one side wall of the second tongue and the corresponding inner wall of the channel section being provided with interlockable means, longitudinal recesses being formed in the side walls of the groove to accommodate sideways outward displacement of the walls of the channel section as it is urged into snap-engagement with the second tongue. However, it is preferred that the only tongue in that provided on either the core or the adaptor section, complementary interlockable formations being provided on at least one side wall of the tongue and the corresponding wall of the groove, the channel formed in the tongue serving to accomodate sideways inward displacement of the walls thereof as the sections are urged into snap engagement.

In the assembly of frames according to the invention, although it is preferred to interengage the section by lateral insertion of the tongue within the groove followed by the application of force to cause snap-action interlocking of the complementary formations, it is possible to interengage them by inserting the tongue from one end with the complementary formations in engaged relationship, followed by the application of longitudinal sliding force. In the latter method of assembly, the fact that the side walls of the channel are resiliently displaceable within the groove is of assistance in that frictional forces are reduced. According to either method of assembly, the interengaged sections cannot be disengaged by the application of lateral forces although they may be longitudinally displaced with respect to each other, at least until such time as the door or window frame is assembled from constituent

lengths of the moulding. This is an advantage not only in facilitating accurate assembly of frames but particularly in the assembly of frames which would have required, accordingly to prior art methods, to have been assembled by reverse butt welding.

Preferably the core section is generally of regular quadrilateral form, for example rectangular, provided with grooves such that one or more adaptor sections each provided with a tongue are attachable to the core section at corner regions therefore. In particular, either a single adaptor section may be attached to form an L section moulding or two adaptor sections may be attached to form T or Z section mouldings. The tongues are shaped for sliding or lateral engagement within the grooves, lateral retention being achieved preferably by interlocking tongue/groove profiles. For example, the extremity of the tongue may be formed with laterally extending portions which are slidingly or snap-receivable within opposed corresponding channels formed in the walls of the grooves, but which prevent lateral withdrawal of the tongue from the groove. Facing surfaces of the adaptor and/or core sections may be profiled to reduce the mating surface area in order to reduce friction on sliding the tongue in the groove, although this function is primarily served by the channel section.

According to a preferred aspect of the invention, the core section is provided with a longitudinal channel formed in one or more of the faces thereof to accommodate window or door operating mechanisms. This feature is rendered possible according to the invention because the adaptor sections are confined to respective corner regions of the core section and do not extend across the width of any face thereof. The core section

preferably also includes a water drainage channel.

Profiled strips for glazing may be inserted in the grooves in the core sections opposite those holding adaptor sections and are retainable therein by the presence of the glazing. Preferably, such strips are provided with an inwardly-angled longitudinal tongue for retention within the groove, such that the tongue can be inserted into the groove by holding the strip at an angle facing towards the glazing or the space to be occupied by the glazing, whereby the tongue is insertable within the groove, and then tilting the strip to an upright position. The tongue, which is preferably provided at its extremity with a laterally extending portion to cooperate when the strip is in the upright position with a corresponding channel formed in the inner wall of the groove, is in this position laterally retained in the groove and, once the glazing and resilient sealing gaskets are inserted between the adaptor section and the profiled strip, is prevented from tilting back to the angled position and is thus held by the glazing in the retained position.

With suitable choice of size for the tongues on the adaptor sections and profiled glazing strips respectively and for the preferred laterally-extending portions thereof, the inner of the opposed channels formed in the walls of the groove for receipt of the laterally-extending portions of the tongue of the adaptor section also is capable of receiving the laterally-extending portion of the tongue of the profiled glazing strip.

Adaptor sections and profiled glazing strips are formed with longitudinal grooves into which resilient weather-sealing elements or gaskets may be inserted.

Adaptor sections and glazing strips may have any desired cross-sectional shape, disregarding tongues, noses for retaining sealing elements, and the like, for example triangular or rectangular, according to aesthetic considerations.

In use, mouldings according to the invention are built up by lateral snap-engagement of or by sliding one or more adaptor sections into a core section to provide an L, T or Z cross-sectional shape and cementing or welding in place. Composite mouldings may then be cut to the desired length for the manufacture of frames. Alternatively, frames may be built up from pre-cut lengths of core section and adaptor section, for example to provide a side frame with an adaptor section at the front (or outside) over some of its length and to the rear (or inside) over the remainder, without the need for reverse butt welding. Before welding or cementing in place, the adaptor sections are readily longitudinally slidable within the cord section to facilitate accurate assembly.

Having prepared a frame from composite mouldings according to the invention, the glazing is inserted by insertion of a resilient gasket strip in the adaptor section, placing the glazing in position against the gasket, clipping in position in the groove in the core section a profiled glazing strip and finally securing the same by insertion of a second resilient gasket between the glazing and the glazing strip. The second gasket prevents the glazing strip from being tilted to its position of removal from the groove in the core section. To remove the glazing, the second gasket is prized out of position and removed, whereupon the glazing strip is removed and thus the glazing.

However, since the invention allows glazing to be inserted from the interior, no security hazard is thereby presented.

The use of the invention allows composite frame mouldings of any cross sectional shape to be assembled from one core section for each size of moulding, together with adaptor sections and profiled glazing strips which are of universal size for any size of core section. Furthermore, a channel for accommodation of operating mechanisms may be provided in one face of the core section which may be used either way round according to where, and in relation to which adaptor sections, the channel is required.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, of which:

Figure 1 is a cross-section of a core section;

Figure 2 is a cross-section of a core section including a channel for receipt of operating mechanisms;

Figure 3 is a cross-section of an adaptor section;

Figure 4 is a cross-section of a profiled glazing strip;

Figure 5(a), (b) and (c) are cross-sections on a reduced scale of completed frame mouldings in various

cross-sectional shapes;

Figure 6 is a cross-section on the same scale as Figure 5, showing an arrangement of frame mouldings to form a frame for an outward-opening door; and

Figure 7 is a cross-section on the same scale as Figure 5, showing an arrangement of frame mouldings to form a frame for a tilt-and-turn window.

With reference firstly to Figure 1, a core section for a door or window frame moulding is shown in cross-section having a generally rectangular shape with end walls 11 connected by side walls 12 with internal reinforcements 13. The spaces 14 bounded by the end walls 11 and reinforcements 13 also act as drainage channels. A groove 15 is formed at each corner position of the core section, the grooves having side walls in which opposed channels 16 are formed. Longitudinal reinforcement strips 17 are formed integrally with the side walls 12. The inner-facing surfaces of the grooves are cut away at 18 to reduce sliding surface area, and hence friction, on insertion of the tongue of an adaptor section within the groove.

As shown in Figure 2, a similar core section to that depicted in Figure 1 is shown, except that it has longer end walls 21 and has a longitudinal channel 22 formed in one side wall. The channel 22 has a depth and width to "Eurochannel" specification such that, together with ledges 23, it can accommodate operating mechanisms.

Figure 3 illustrates one form of an adaptor section for sliding interlockable engagement with the core section of either Figure 1 or Figure 2. The adaptor is of

essentially triangular cross-sectional shape and comprises a sloping front face 31, an upright rear face 32, and a groove 33 with restricted access through a slot defined by an upward extension 34 of rear face 32 and an overhanging lip 35. The groove 33 is for receipt of a resilient weatherproofing strip (not shown). A longitudinal tongue 36 is provided at its extremity with laterally extending portions 37; the tongue is slidngly or laterally snap-insertable in grooves 15 of the core sections of Figs. 1 and 2, and the adaptor is laterally held therein by the interaction of the portions 37 in opposed channels 16 (Figs. 1 and 2). The dotted lines at 38, 39 show one way of profiling mating surfaces of the adaptor section with the core section to reduce the sliding surface area. This avoids substantial jamming on inserting the tongue in the groove and also provides resilience to the corner 40 to facilitate a better seal with the mating corner of the core section. However, channel 36a formed in tongue 36 provides for inward resilient displacement of the portions 37 to permit snap-engagement and to facilitate sliding movement.

As shown in Figure 4, a profiled strip for glazing comprises a sloping front face 41, upright rear face 42, groove 43, upward extension 44 of rear face 42, and overhanging lip 45, corresponding to features 31-35 of the adaptor section of Fig. 3. The profiled strip further includes an inwardly-angled longitudinal tongue 46 provided at its extremity with a laterally extending lug portion 47. The tongue 46 is insertable laterally in grooves 15 (Figs. 1 and 2) by holding the strip at an angle so that the tongue lies within the groove and then tilting so that the lug portion 47 engages in a channel 16. The presence of glazing prevents the strip tilting back to the angled position, thus ensuring that the strip is laterally held in position.

Figs 5 (a), (b) and (c) illustrate how core sections

as shown in Fig. 1 and adaptor sections as shown in Fig. 2 can be interlocked to form an L section moulding (Fig. 5(a)), a T section moulding (Fig. 5 (b)) and a Z section moulding (Fig. 5 (c)).

Figure 6 illustrates a cross-section of a side portion of a complete frame assembly for an outward-opening door, in which an L section light-duty moulding 61, similar to that illustrated in Fig. 5 (a), is attached to a masonry wall 62, having an interior face 62a and an exterior face 62b. The frame of the opening casement is provided by a T shaped moulding constituted by a heavy-duty core section 63 including a mechanism channel and adaptor sections 64 and 65. Glazing 66 is held between adaptor section 64 and a profiled glazing strip 67, resilient gaskets being held within grooves 68 and 69 but omitted from the drawing for the sake of clarity. The door is hinged about the frame (not shown) at the other side and therefore opens and closes as shown by the arrow. The adaptor section 65 is of rectangular, rather than triangular, cross-sectional shape and is provided to abut frame moulding 61 when the door is closed. Resilient sealing gaskets (not shown) are provided in groove 70 of adaptor section 65 and groove 71 of the adaptor section forming part of frame moulding 61.

Referring to Figure 7, a cross-section of a side portion of a complete frame for a tilt-and-turn window consists of an L section moulding 72 formed from a heavy-duty core section with a mechanism channel (not in use as such) and a triangular adaptor section secured to the masonry 73 at one side of the window aperture, the masonry having an interior face 73a and an exterior face 73b. The frame of the opening casement is provided by a

Z-shaped moulding constituted by a heavy-duty core section 74 and triangular adaptor sections 75 and 76. Glazing 77 is held between adaptor section 76 and profiled glazing strip 78, accessible from the interior. Resilient sealing gaskets (not shown) are provided in grooves 79, 80, 81 and 82. In use, the casement can turn inwardly for ventilation or exterior cleaning, about a vertical axis at the other side frame, so that it opens and closes in the direction shown by the curved arrow, or can tilt inwardly about a horizontal axis either at the bottom of the window or at a midway position, so that it opens and closes in the direction shown by the straight arrow.

CLAIMS

1. A composite window or door frame moulding comprising a core section and one or more adaptor sections, in which the said one or more adaptor sections is/are interengageable with the core section to provide a composite moulding having an L, T or Z cross-section, interengagement being provided by a tongue formed in one of said sections and a groove formed in the other, the tongue and groove being provided with mutually interlockable complementary formations to prevent lateral disengagement of the sections, the tongue having a longitudinal channel the walls of which are resiliently displaceable to permit snap-engagement of the said complementary formations.

2. A moulding according to Claim 1, in which the complementary formations are constituted by a tongue formed on the base of the groove and interengageable with the channel, at least one side of the said tongue and the corresponding inner wall of the channel being provided with interlockable means.

3. A moulding according to Claim 1, in which the mutually interlockable complementary formations are provided between at least one side of the tongue and the corresponding wall of the groove.

4. A moulding according to any preceding claim, in which facing surfaces of adaptor and/or core sections are profiled to reduce the contact surface area.

5. A moulding according to any preceding claim, in which the core section is rectangular in cross-section and is provided in a face thereof with a longitudinal

channel to accommodate a window or door operating mechanism.

6. A moulding according to any preceding claim, in which the core section includes a water drainage channel.

7. A moulding according to any preceding claim, further including a profiled glazing strip retainable in the core section by glazing or other sheet material.

8. A moulding according to Claim 7, in which the glazing strip includes an inwardly-angled tongue for retention within a groove of the core section.

9. A moulding according to Claim 8, in which the tongue of the glazing strip is provided at its extremity with a laterally extending portion for engagement with a channel formed in the inner wall of the groove to retain the tongue in the groove in the presence of glazing and sealing gaskets.

10. A method of construction of a composite window or door frame from a moulding according to any of Claims 1 to 9, in which one or more adaptor sections are interengaged with a core section to provide an L, T or Z moulding and cut to length, assembled and secured together to form a frame.

11. A window or door frame assembly having peripheral rectangular frame components and a mullion or transom dividing the frame into at least two parts, in which the frame assembly is formed from composite mouldings according to any of Claims 1 to 9, wherein one part of the frame has the adaptor sections facing to the front

of the frame and the other part of the frame has the adaptor sections facing to the rear of the frame, each side component of the frame to which the mullion or transom is attached being formed from a single core section extending to the full length or depth of the frame without intermediate joints.

12. A composite window or door frame moulding constructed and arranged substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.